

Authors

Martin S. Axelrod

B.E.E. summa cum laude, 1959; M.E.E., 1960, New York University. Joined IBM Research Center in 1960. Is presently a Research Staff member engaged in tunnel-diode machine technology research. Is member of Eta Kappa Nu, Tau Beta Pi, Institute of Radio Engineers, and the American Institute of Electrical Engineers.

Louella Cook

A.B., 1958, Antioch College. Was assistant in psychophysiological research at Fels Research Institute. Joined IBM in 1959 as a Junior Psychologist to work on biophysics project investigating evoked potentials from human subjects. Was also engaged on pilot study of the Arithmetic Tutor Teaching device at the Yorktown schools. Is presently a member of the Biophysics Group at Thomas J. Watson Research Center.

William S. Dorn

B.S. in Physics, 1951; Ph.D. in Mathematics, 1955, Carnegie Institute of Technology. Member of the Computations Sections of General Electric's Aircraft Gas Turbine Division, 1955-57. Research Scientist with the AEC Computing and Applied Mathematics Center at New York University from 1957-59. Joined IBM as a member of the Mathematics Department at the Yorktown Heights Research Center in 1959. Became manager of the Computing Center in 1961. Is a member of the Mathematical Association of America, Society for Industrial and Applied Mathematics, Association for Computing Machinery, the Institute for Management Sciences, and Research Society of America.

Leo Esaki

M.S. equivalent in Physics, 1947; Ph.D. equivalent in Physics, 1959, The University of Tokyo. Joined IBM Research Center, Poughkeepsie, in 1960. Was previously associated with Sony Corporation, Tokyo, Japan. Is presently engaged in semimetal studies at the Thomas J. Watson Research Center. Was awarded the Morris Liebmann Memorial Prize of the IRE in 1961 and the Stuart Ballantine Medal by the Franklin Institute in 1961. Fellow of the American Physical Society, senior member of the Institute of Radio Engineers, and member of the Physical Society of Japan.

Arnold S. Farber

B.E.E., 1956, City College of New York; M.S.E.E., 1960, Columbia University. Joined IBM in 1956 to work on a maser time standard. Has since performed research at the Thomas J. Watson Research Center on high-speed microwave and tunnel-diode logic circuits. Member of the Institute of Radio Engineers and Eta Kappa Nu.

Eustace E. Francis

B.S. in Physics, 1949, M.S. in Physics, 1951, Fisk University. 1951-54, Assistant at Pennsylvania State University, working in solid state physics and instrumentation analysis. Assistant Professor of Physics, Bard College, 1954-55. In 1955 he joined IBM as Associate Physicist in the Physical Technology Department of the General Products Division Development Laboratory at Endicott.

Theodore H. Geballe

B.S. in Physics, 1940; Ph.D. in Chemistry, 1950, University of California. Was Research Associate, University of California, 1950-52. Dr. Geballe had served in the Army in 1941-46, in which he held the rank of Captain, Ordnance Department. He has been Member of the Technical Staff at the Bell Telephone Laboratories since 1952 and has been engaged in research in superconductors and semiconductors. Is Fellow of the American Physical Society and member of the American Chemical Society, Phi Beta Kappa and Sigma Xi.

Richard M. Karp

A.B., 1955; S.M., 1956; Ph.D., 1959, Harvard University. Staff of Harvard Computation Laboratory, 1957-59. Since January, 1959, has been engaged in research in switching theory, information theory, and combinatorial problems at the Thomas J. Watson Research Center. Adjunct Assistant Professor of Electrical Engineering, New York University, 1960-61. Member of Sigma Xi and Scientific Research Society of America.

Manfred Kochen

B.S., 1950, Massachusetts Institute of Technology; M.A., 1951, Ph.D., 1955, Columbia University, Applied Mathematics. Previously with Biot and Arnold, 1950-52; Lecturer at Columbia, 1953; Institute for Advanced Study and consultant with Paul Rosenberg Associates, 1953-55; Ford Foundation Fellow at Harvard, 1955-56. Joined IBM in 1956 as staff mathematician in the Information Research Group and is now on the Research Technical Staff, Thomas J. Watson Research Center. Principal interests are mathematical theory of organized systems, communication theory and models for learning and cognition. Is currently manager of the Information Retrieval Project in the Experimental Systems Department. Member of the American Mathematical Society and American Physical Society.

Ta-Cheng Ku

B.S.M.E., National Pei Yang University, 1946; M.S.M.E., University of California, 1950; Ph.D., University of California, 1953. Joined IBM in 1953 as Associate Engineer in the Physical Technology Department of the General Products Division Laboratory in Endicott. Interests include investigation of print quality, mechanism of carbon transfer,

photoelasticity, vibration, friction and wear. Presently Manager of the Physical Technology Department at Endicott.

Robert E. Lyons

B.S., 1950, Massachusetts Institute of Technology; M.S., 1953, University of Maryland; Electrical Engineer's Degree, 1956, M.I.T. 1951-58, electronic engineer at National Security Agency. In 1958, joined IBM at the Space Guidance Center of the Federal Systems Division in Owego. Work included advanced systems research and systems analysis. At present, on IBM Fellowship Program at M.I.T., working toward Sc.D. Is a member of Institute of Radio Engineers.

Bernd T. Matthias

Ph.D. in Physics, Eidgenoessische Technische Hochschule, (Zurich), 1943. Was scientific collaborator, Fed. Inst. Tech., 1942-47 and was member of the staff of the Division of Industrial Cooperation, Massachusetts Institute of Technology, 1947-48. Was Assistant Professor of Physics, University of Chicago, 1949-51. In 1948-49 and from 1951 to the present, Dr. Matthias has been Member of the Technical Staff, Bell Telephone Laboratories. Since 1961 he has also been Professor of Physics at the University of California at La Jolla. Is Fellow of the American Physical Society and Member of the Swiss Physical Society. Dr. Matthias has done research in ferroelectrics and in superconductivity and ferromagnetism, and in correlations between the two latter phenomena.

Daniel C. Mattis

B.S., 1953, Massachusetts Institute of Technology. Ph.D. in Physics, 1957, University of Illinois. Thesis under Professor John Bardeen, on the quantum theory of ac conductivity. Spent a year at the École Normale Supérieure in Paris in a group headed by Pierre Aigrain, under a grant from the CNRS, before joining IBM. Now is a member of the Mathematical Physics Department at the Thomas J. Watson Research Center and is specializing in problems in the theory of ferromagnetism. Member of American Physical Society, the American Institute of Physics and Sigma Xi.

Charles Le Méhauté

M.S. École Nationale Supérieure d'Ingénieurs, Nantes, France, 1952; Institut Supérieur des Matériaux, Paris, 1954. Worked as a physicist at Sud-Aviation in 1955. Joined IBM France in 1956. Is manager of the Materials Laboratory in the Development Engineering Center, La Gaude, France. Member of the French Physical Society, the French Metallurgical Society and the French Society of Physics and Chemistry.

John E. Meggitt

B.A., 1953; Ph.D., 1958, Cambridge University. Awarded the First Smith Prize at Cambridge in 1955 and elected to

a Research Fellowship at Emmanuel College. 1956-58, A. V. Roe and Co., working on numerical machine tool control. Joined IBM British Laboratory at Hursley, Winchester in 1958. Interests include error correcting codes and small microprogrammed computers.

Tibor Rado

Ph.D. in Mathematics, University of Szeged, Hungary, 1922; honorary Doctor of Sciences, Kenyon College, 1960. Was Visiting Lecturer at Harvard University and Rice Institute, 1929-30; Professor of Mathematics, Ohio State University, 1930; Chairman of Department, 1946-48; University Research Professor since 1949; Visiting Professor, University of Chicago, 1942; University of Puerto Rico, 1947; Kansas State University, 1961. Colloquial Lecturer, American Mathematical Society, 1945; Hedrick Memorial Lecturer, Mathematical Association of America, 1952; Visiting Lecturer of the Mathematical Association of America and of the National Science Foundation, 1960; International Research Fellow of the Rockefeller Foundation (Munich, Germany), 1928-29; Vice-President, AAAS, 1954. Served (on Russian front) as First Lieutenant in the Hungarian Army in World War I. Served as consultant in World War II with the U.S. Air Force in the European Theatre of Operations (as a civilian with the rank of Colonel). After research in various fields of mathematics, began to concentrate upon computer theory and the background in logic, as well as actual programming as a basis for theoretical research. Member of American Mathematical Society, Mathematical Association of America, and American Association for Advancement of Science.

Donald E. Rosenheim

B.S. in Electrical Engineering magna cum laude, Polytechnic Institute of Brooklyn, 1949; M.S. in Electrical Engineering, Columbia University, 1957. From 1949 to 1951 he was engaged in development work on "servo-synchronized" transmitting equipment for the Servo Corporation of America. Was Lecturer in Electrical Engineering at City College, New York, in 1956, and Lecturer in Electrical Engineering at Columbia University in 1958. Joined IBM Engineering Laboratories in Poughkeepsie, N.Y. in 1951. From 1951 to 1953 was engaged in development work and instruction on the IBM 701. From 1953 to 1960 was at the IBM Watson Laboratory at Columbia University, where he was engaged in digital computer research, high-speed logic, pulse techniques, and reliability research. Since 1960, has been at the Thomas J. Watson Research Center, and has been engaged in research on high-speed tunnel-diode logic circuits and systems. Is member of Tau Beta Pi, Eta Kappa Nu, Sigma Xi, and is senior member of the Institute of Radio Engineers.

J. Paul Roth

B.M.E., University of Detroit, 1946; M.S. in Mathematics, 1948; Doctor of Philosophy (Mathematics), University of Michigan, 1953. Joined IBM Research in July, 1956. Had been employed as Research Engineer, Continental

Aviation and Engineering Corporation, Detroit, Michigan, 1946-47; Research Associate, mathematics group, Engineering Research Institute, University of Michigan, Ann Arbor, 1947-53; Pierce Instructor of Mathematics, University of California, Berkeley, 1953-55; Staff Mathematician, electronic computer project, Institute for Advanced Study, Princeton, working under grant supported by Army, Office of Naval Research and Air Research and Development Command; Visiting Assistant Professor of Mathematics, Princeton University, 1957-58. Professor, Centro Internazionale Matematico Estivo, Varenna, Italy, 1959; Lecturer, Moore School of Electrical Engineering, University of Pennsylvania, Summer, 1961. Is presently Logic Automation Manager, Data Systems Division in Poughkeepsie. Is member of American Mathematical Society, Society for Industrial and Applied Mathematics, and Sigma Xi.

Roland M. Schaffert

A.B., 1930, Doane College, Crete, Nebraska; A.B., 1930, M.S., 1931, Ph.D., 1933, University of Cincinnati; Laws Fellow in Physics, 1930-33, University of Cincinnati. Assistant Professor of Physics at Duquesne University, 1934-36. Research physicist at Mergenthaler Linotype Co., 1936-41. Battelle Memorial Institute, 1941-56; pioneered development of xerography. Joined IBM in 1956 in the Non-Mechanical Printing Department at the Endicott Laboratory. Presently located at the San Jose General Products Development Laboratory in the Photo Optical Technology Department. Senior member of IRE, Fellow of AAAS, member of American Physical Society, Electrochemical Society of America, Society of Photographic Scientists and Engineers, Technical Association of Graphic Arts, and Research and Engineering Council of Graphic Arts Industry.

Geza Schay, Jr.

B.A., 1956, Eötvös University, Budapest, and Ph.D. in Mathematical Physics, 1961, Princeton University. Joined IBM in 1960 as a staff mathematician in the Applied Mathematics Group, Advanced Systems Development Division. Prior to joining IBM he worked at the Central Research Institute for Physics in Budapest and later at the Research Laboratory of Electronics of MIT, and taught

physics at Tufts University. Is presently working in the Advanced Information Systems Department, at the Mohansic Laboratory, primarily on stochastic problems.

Magnus Tideman

Fil. lic. in Mathematics, 1950, University of Uppsala. Was Lecturer, 1950-55, University of Uppsala. Dr. Tideman has been employed as a mathematician since 1955 at the SAAB Aircraft Company, Linköping, Sweden.

William R. Uttal

B.S. in Physics, 1951, University of Cincinnati; Ph.D. in Experimental Psychology and Biophysics, 1957, Ohio State University. Joined IBM Research Center in 1957 and was engaged in research in sensory biophysics and computer applied behavior and biological physics. Is currently manager of the Biophysics Group at the Thomas J. Watson Research Center and is also studying the use of digital computers as teaching devices. Is member of The American Psychological Association, The Biophysical Society, The Psychonomic Society, and Sigma Xi.

Wouter Vanderkulk

M.S. in Mathematics, 1939, Ph.D. in Mathematics, 1945, University of Leiden, The Netherlands. Assistant to Prof. J. A. Schouton at Delft University, The Netherlands, 1939-45. Instructor and later Assistant Professor of Mathematics at Brown University, 1946-52. Bell Aircraft Corp., 1952-56; mathematical assistance on engineering activities related to rocket combustion, electronics, and flutter analysis. Joined IBM as senior mathematician at the Space Guidance Center of the Federal Systems Division in Owego. Work includes investigation of computational requirements of advanced military systems by means of analytical simulation techniques. Now on educational leave of absence at Scripps Oceanographic Institute, La Jolla, Calif.

Eugene Wong

B.S.E., 1955; A.M., 1958; Ph.D. in Electrical Engineering, 1959, Princeton University. N.S.F. Post-Doctoral Fellow at University of Cambridge, 1959-60. Joined IBM in 1955. Is presently engaged in research on information retrieval at the Thomas J. Watson Research Center at Yorktown. Member of Sigma Xi and Institute of Radio Engineers.



The IBM Journal of Research and Development is regularly indexed and abstracted by Science Abstracts (I.E.E.—Britain), Chemical Abstracts, The Engineering Index, Physikalische Berichte, ASM Review of Metal Literature, Mathematical Reviews, Computing Reviews, Computer Abstracts (Technical Information Co. Ltd.—Britain), Bulletin Signalétique (C.N.R.S.—France), Electronic Industries & Tele-Tech, Electronic Technology, Semiconductor Electronics, Instrument Abstracts (British Scientific Instrument Research Association), Psychological Abstracts, Aviation Research & Development and the Library of U. S. Naval Research Laboratory.